



Australian Government

AURPTR003 Service and repair outdoor power equipment engine management systems

Release: 1

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Modification History

Release	Comment
Release 1	New unit of competency.

Application

This unit describes the performance outcomes required to service and repair outdoor power equipment engine management systems (EMS) according to manufacturer specifications. It involves preparing for the task, determining the service and repair requirements, carrying out the service and repair, performing post-repair testing, and completing workplace processes and documentation.

It applies to those working in the outdoor power equipment service and repair industry. The EMS include electronic fuel injection and emission systems in hand-held or wheeled equipment. EMS may include those of two- and four-stroke spark ignition engines.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Competency Field

Outdoor Power Equipment

Unit Sector

Technical- Electrical and Electronic

Elements and Performance Criteria

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold and italicised text is used, further information is detailed in the range of conditions section.
1. Prepare to service and repair EMS	1.1 Job requirements are determined from workplace instructions 1.2 <i>Service and repair procedures</i> and information are sourced and

Elements	Performance Criteria
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	interpreted 1.3 Hazards associated with the work are identified and risks are managed 1.4 Tools, equipment and materials are selected and checked for serviceability
2. Determine service and repair requirements of EMS	2.1 System is inspected and tested according to manufacturer specifications, workplace procedures, and safety requirements 2.2 Faults are identified from inspection and causes of faults are determined 2.3 Inspection findings and test results are reported according to workplace procedures, and include recommendations for necessary service, repair or adjustment 2.4 Authorisation to proceed with service and repair is obtained according to workplace procedures
3. Carry out service and repair activities	3.1 Service and repair options are analysed and those most appropriate to the circumstances are selected 3.2 Tools, equipment and materials are selected and checked 3.3 Components are removed and inspected for serviceability according to manufacturer specifications, workplace procedures, and safety and environmental requirements 3.4 Reusable, repaired and replacement components are fitted and adjusted according to manufacturer specifications and workplace procedures
4. Check EMS for normal operation	4.1 System is operated and compared to manufacturer specifications according to workplace procedures and safety requirements 4.2 Adjustments are made as required and EMS is re-tested
5. Complete work processes	5.1 Final inspection is made to ensure work is to workplace expectations and equipment is presented ready for use, including protective guards, cowlings and safety features 5.2 Work area is cleaned, waste and non-recyclable materials are disposed of, and recyclable material is collected 5.3 Tools and equipment are checked and stored according to workplace procedures 5.4 Workplace documentation is processed according to workplace procedures

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance and are not explicit in the performance criteria.

Skills	Description
Learning skills to:	locate appropriate sources of information efficiently.
Reading skills to:	interpret information from manufacturer and workshop literature when seeking EMS specifications and procedures.
Writing skills to:	legibly and accurately fill out workplace documentation when reporting inspection findings, making repair recommendations, and recording parts and material used.
Numeracy skills to:	- measure EMS components and use basic mathematical operations, including addition and subtraction, to calculate distances, tolerances and deviations from manufacturer specifications - measure electrical components for comparison to manufacturer specifications.
Planning and organising skills to:	plan own work requirements and prioritise actions to achieve required outcomes and ensure tasks are completed within workplace timeframes.
Technology skills to:	use diagnostic EMS equipment.

Range of Conditions

This section specifies work environments and conditions that may affect performance.

Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included. Bold italicised wording, if used in the performance criteria, is detailed below.

<i>Service and repair procedures</i> must include:	- inspecting, servicing, repairing and replacing components - performing diagnostic routines - reading and resetting error codes - testing repaired units - documenting and reporting service and repair procedures.
<i>Safety requirements</i> must include:	- work health and safety (WHS) and occupational health and safety (OHS) requirements, including procedures for: - selecting and using personal protective equipment (PPE) - working with electrical systems - operating engines safely.
<i>Environmental</i>	procedures for trapping, storing and disposing of fuel released

requirements must include:	from the EMS.
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Unit Mapping Information

No equivalent unit.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b4278d82-d487-4070-a8c4-78045ec695b1>

Assessment Requirements for AURPTR003 Service and repair outdoor power equipment engine management systems

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Performance Evidence

Before competency can be determined, individuals must demonstrate they can perform the following according to the standards defined in this unit's elements, performance criteria, range of conditions and foundation skills:

- use diagnostic tools to perform checks on two different outdoor power equipment engine management systems (EMS), in which the work must involve validating error codes and downloading EMS software
- service and repair the above two outdoor power equipment EMS, in which the work must involve the following components:
 - fuel injection pump
 - fuel injector or carburettor
 - spark plug
 - ignition coil pack
 - generator or compensator
 - electronic control unit
 - sensors, including:
 - crankshaft angle
 - engine speed sensor
 - crankcase temperature and pressure sensor
 - emission control systems
- on two occasions carry out EMS diagnosis, calibration and adjustment using relevant manufacturer engine diagnosis device.

Knowledge Evidence

Individuals must be able to demonstrate knowledge of:

- work health and safety (WHS) and occupational health and safety (OHS) requirements relating to servicing and repairing engine management systems, including procedures for:
 - selecting and using personal protective equipment (PPE)
 - working with electrical systems
 - operating engines safely
- environmental requirements, including procedures for trapping, storing and disposing of fuel released from the EMS
- operating principles of outdoor power equipment EMS, including:
 - air fuel ratios and chemistry of combustion
 - composition of petrol fuel, including octane rating
 - open and closed loop injection
 - engine emissions
- application, purpose and operation of EMS components, including:
 - fuel system components:
 - fuel injection pump
 - fuel injector
 - tank, cap and lines
 - electronic control system components:
 - electronic control unit
 - throttle position sensor
 - generator
 - crankshaft angle and engine speed
 - crankcase air temperature and pressure sensor
 - manifold absolute pressure (MAP) sensor
 - oxygen sensor
 - ignition system, including:
 - spark plug
 - high tension lead
 - coil
 - engine emission control system, including:
 - emission standards
 - engine emission design technology
 - evaporative
 - exhaust
 - crankcase
- identification, selection and operation of EMS diagnostic tools relevant to the engine brand and system type
- procedures for system data retrieval in order to determine usage of product, fuel quality values, system parameters and service history
- service and repair procedures available from EMS manufacturer manuals, including removal, replacement, calibration and adjustment procedures for EMS, including:

- fuel system
- ignition system
- electronic control system
- emission control system
- post-repair testing procedures for EMS, including:
 - operating engine system through full operating range
 - verify manufacturer specifications
 - performance benchmarking product against specifications.

Assessment Conditions

Assessors must satisfy NVR/AQTF assessor requirements.

Competency is to be assessed in the workplace or a simulated environment that accurately reflects performance in a real workplace setting.

Assessment must include direct observation of tasks.

Where assessment of competency includes third-party evidence, individuals must provide evidence that links them to the EMS that they have serviced and repaired, e.g. repair orders.

Assessors must verify performance evidence through questioning on skills and knowledge to ensure correct interpretation and application.

The following resources must be made available:

- outdoor power equipment repair workplace or simulated workplace
- workplace instructions
- manufacturer specifications for EMS
- area and equipment, including PPE, required to safely test EMS
- two outdoor power equipment EMS requiring service and repair
- tools, equipment and materials appropriate for servicing and repairing EMS, including:
 - industry relevant engine diagnosis devices, including computer and system software, communications adaptor and connecting cables
- multimeter.

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